DOCUMENT RESUME

ED 351 550 CE 062 415

AUTHOR Finch, Curtis R.; And Others
TITLE Course-Taking Patterns of Vocational Teacher Education Baccalaureate Degree Recipients: Teacher Preparation, General Education, and Teaching Content Area Studies.
INSTITUTION National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Nov 92
CONTRACT V051A80004-90A
NOTE 71p.; Prepared with the assistance of the Southern Regional Education Board.
AVAILABLE FROM NCRVE Materials Distribution Service, Horrabin Hall 46, Western Illinois University, Macomb, IL 61455 (order no. MDS-165: $4).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Academic Education; Basic Skills; *Course Selection (Students); Educational Research; *Education Majors; Elective Courses; English; *General Education; Higher Education; Integrated Curriculum; Mathematics; *Preservice Teacher Education; Required Courses; Sciences; Secondary Education; Social Sciences; Specialization; Vocational Education; *Vocational Education Teachers

ABSTRACT

A study documented coursework completed by graduates of university vocational teacher preparation programs. Twenty-two universities and colleges preparing vocational education teachers provided transcripts for 1988-89 graduates; data from 412 transcripts were coded. Courses taken within various categories were analyzed and comparisons made among teaching majors in terms of amount of coursework taken. Graduates completed extensive numbers of technical subject matter content courses that included a reasonable balance between upper- and lower-level course taking. They completed a range of mathematics, social science, science, and English general education studies. Teacher educators appeared to review the upper-level course-taking patterns of their students to ensure they were not missing opportunities to enrich the general studies component of their programs. Vocational teacher coursework taken in mathematics, social science, English, and science was similar to that taken by graduates reported in other studies. A suggestion was that teacher educators systematically assess the course-taking patterns of prospective vocational education teachers and determine whether general education studies requirements were sufficient to provide graduates with mathematics, social science, science, and English capabilities for functioning effectively in their professional roles as they are asked to integrate academic skills. (Appendixes include 15 references and tables and data related to study results.) (YLB)

ED351556

NCRVE

National Center for Research in Vocational Education

University of California, Berkeley

COURSE-TAKING PATTERNS OF VOCATIONAL TEACHER EDUCATION BACCALAUREATE DEGREE RECIPIENTS: TEACHER PREPARATION, GENERAL EDUCATION, AND TEACHING CONTENT AREA STUDIES

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Supported by
the Office of Vocational and Adult Education,
U.S. Department of Education

BEST COPY AVAILABLE

This publication is available from the:

National Center for Research in Vocational Education
Materials Distribution Service
Western Illinois University
46 Horrabin Hall
Macomb, IL 61455

800-637-7652 (Toll Free)

COURSE-TAKING PATTERNS OF VOCATIONAL TEACHER EDUCATION BACCALAUREATE DEGREE RECIPIENTS: TEACHER PREPARATION, GENERAL EDUCATION, AND TEACHING CONTENT AREA STUDIES

Curtis R. Finch
B. June Schmidt
J. Dale Oliver
Kuang-Chao Yu
Alice Wills*

Virginia Polytechnic Institute and State University

National Center for Research in Vocational Education
University of California at Berkeley
1995 University Avenue, Suite 375
Berkeley, CA 94704

Supported by
The Office of Vocational and Adult Education,
U.S. Department of Education

CE062415

November, 1992 MDS-165

*This report was prepared with the assistance of the Southern Regional Education Board, Atlanta, Georgia.

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education
Grant Number:	V051A80004-90A
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act P.L. 98-524
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, DC 20202
Grantee:	The Regents of the University of California National Center for Research in Vocational Education 1995 University Avenue, Suite 375 Berkeley, CA 94704
Director:	Charles S. Benson
Percent of Total Grant Financed by Federal Money:	100%
Dollar Amount of Federal Funds for Grant:	$5,675,000
Disclaimer:	This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." Therefore, the National Center for Research in Vocational Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

ACKNOWLEDGMENTS

This project could not have been completed without the assistance and support provided by staff members at the Southern Regional Education Board (SREB). SREB staff who assisted with the study design and facilitated the data collection process included Gene Bottoms, Director, SREB–State Vocational Education Consortium; Alice Presson, Program Associate; and Lynn Cornett, Vice President, State Services.

Significant contributions to the project were also made by members of the SREB–State Vocational Education Consortium Teacher Education and Certification Committee who served as the steering group for the project. These persons were David Spence, Committee Chair and Executive Vice Chancellor, Board of Regents, University System of Georgia; Jack Blackburn, Associate Vice President for Academic Affairs, Auburn University; Audrey Carr, State Director of Vocational Education, Kentucky; Gerald Cheek, Head, Department of Technological and Adult Education, University of Tennessee; Pat Hall, Director of Instructional Support Services, Division of Vocational and Adult Education, Florida Education Center; Paula Heinke, Basic Skills Coordinator, Randoph County Vo-Tech Center, Elkins, West Virginia; Bernice Johnson, Assistant Professor, Department of Home Economics, North Carolina Central University; Richard Lynch, Chair, Division of Adult, Business, and Vocational Education, University of Georgia; John McCreary, Dean, School of Business, Western Carolina University; Gary Moore, Head, Department of Occupational Education, North Carolina State University; Arnold Moore, Dean, College of Education, Mississippi State University; Gerald Thomas, Consultant, Teacher Education and Staff Development, Georgia Department of Education; and Alvin Wilbanks, Assistant Superintendent, Gwinnett County Schools, Lawrenceville, Georgia.

Finally, appreciation is extended to those who served as contact persons at the twenty-two universities that participated in the study. It was through their efforts that transcripts were gathered and submitted in an efficient and timely manner.

EXECUTIVE SUMMARY

As greater numbers of vocational teachers are asked to integrate academic skills into their vocational education subject areas, consideration must be given to the preparation these teachers need as they assume this new teaching role. This research addressed the above concern by focusing on the coursework vocational education teachers complete during their teacher preparation studies. Twenty-two universities and colleges preparing vocational education teachers provided researchers with transcripts for 1988-1989 graduates from the vocational education areas of agriculture, business, home economics, marketing, technology, and trade and industrial education. Transcripts were analyzed based on a 141-field coding scheme with information drawn from each transcript including courses taken within various categories (e.g., mathematics and computer science; social science; science; English; language, fine arts, philosophy, and other humanities; teaching content area; and education).

Comparisons were made among teaching majors in terms of the amount of coursework taken. Graduates completed extensive numbers of technical subject matter content courses that included a reasonable balance between upper and lower level course taking. It was found that university graduates completed a range of mathematics, social science, science, and English general education studies. Information gathered from graduates' transcripts suggests that teacher educators review the upper level course-taking patterns of their students to ensure that prospective teachers are not missing opportunities to enrich the general studies component of their programs. Teacher educators should also examine and perhaps reconsider the mathematics and science requirements currently in place for vocational teacher education majors.

Vocational teacher coursework taken in mathematics, social science, English, and science was similar to that taken by graduates reported in other studies. However, this similarity in general studies coursework between groups does not necessarily reflect what should be since authors of the earlier studies felt their student groups had less than adequate general education studies preparation. It is suggested that teacher educators systematically assess the course-taking patterns of prospective vocational education teachers at their institutions and determine whether general education studies requirements are sufficient to provide program graduates with mathematics, social science, science, and English capabilities for functioning effectively in their professional roles.

TABLE OF CONTENTS

Acknowledgments i

Executive Summary iii

Overview 1

Objective 2

Assumptions 3

Limitations 4

Method 4

Results 7

- Question One — Types and Total Credits of Coursework 7
- Question Two — Coursework Taken by Teaching Major 8
- Question Three — Mathematics, Science, and English Coursework 12
- Question Four — Comparison of Courses Taken 15

Discussion and Implications 15

References 19

Appendix A: Tables Related to Study Results 21

Appendix B: Institution Background Information Form 37

Appendix C: Coding Guide 41

Appendix D: Participating Institutions 47

Appendix E: Number of Prospective Vocational Teachers by Institution and Vocational Education Area 51

Appendix F: Types and Total Credits of Coursework Completed by Prospective Vocational Teachers in Each Teaching Area 55

OVERVIEW

Changes in society have had and continue to have great impact on vocational education. Several examples of influencing changes in the workplace include the increased need for employees with basic skills competence (Lotto, 1988), greater need for employees that are computer literate (Rosenfield, 1988), and a need for employees that can work efficiently as members of teams and take more individual initiative in the workplace (Bailey, 1990). These trends and needs as well as others have strong implications for vocational education in areas such as program planning, curriculum development, instruction, and teacher preparation.

Additional changes are also having a profound impact on vocational teacher preparation. Building upon the numerous studies and reports related to education reform in the United States were several critical examinations of teacher education. For example, *Tomorrow's Teachers* (Holmes Group, 1986) and *A Nation Prepared: Teachers for the 21st Century* (Carnegie Forum on Education and the Economy, 1986) recommended that a bachelor's degree in the arts and sciences serve as a prerequisite for the professional study of teaching. Focusing more directly on vocational teacher education, *The Unfinished Agenda* (National Commission on Secondary Vocational Education, 1985) recommends that vocational education teachers should attain the same level of education as their academic teacher counterparts. A more recent report (Lynch, 1990) has confirmed that the reform movement is indeed having an impact on vocational teacher education programs. The greatest changes appear to be increases in student entrance and exit requirements, an increase in the time associated with field-based internships and student teaching, and an increase in the number of general education or liberal studies courses required (p. 142). Several institutions reported that movement was being made toward a fifth-year or postbaccalaureate program. Indeed, the teacher education reform movement coupled with state budget crises has stimulated several universities to abolish their undergraduate teacher education programs (Diegmueller, 1991).

These pressures raise several questions about what university vocational teacher education programs can and should be. Should these programs culminate in a baccalaureate degree or require postbaccalaureate studies? How many courses and experiences in general or liberal studies, teacher preparation studies, and teaching content area studies (e.g., agriculture, business, and marketing) should be included in a program?

To what extent are current programs providing a reasonable and acceptable set of courses and experiences?

Unfortunately, these questions all relate to a more basic question: What is the optimum mix of preparation studies and experiences for vocational teachers (Finch, 1991)? Concern about the preparation of teachers in general and vocational teachers in particular is well documented. For example, Beyer, Feinberg, Pagano, and Whitson (1989) question the divisions between educational and liberal studies that many teacher education reformers take for granted. The authors contend that "teacher education is not so far removed from liberal education as present-day reformers would suppose" (p. 1). The authors go on to describe a model for the study of education as a liberal discipline. Lynch and Griggs (1989) likewise take issue with reformers' views of teacher education. They question the notion that a degree in arts and sciences (or in subject matter that is most appropriate for vocational education) will ensure success in teaching a particular vocational subject. In summary, although concern exists as to what constitutes an ideal teacher education program, little hard evidence exists in support of these concerns.

OBJECTIVE

This study focused on one subset of vocational teacher preparation: the course-taking patterns of vocational teacher education baccalaureate degree recipients. As such, the study's intent was to document information related to undergraduate coursework of persons who completed degrees in various vocational teaching areas. The information that is presented should not be interpreted as any sort of mandate or deficiency; rather, it should be viewed as status information which, together with information from other sources, can assist teacher educators, administrators, and policymakers in determining what the optimum mix of coursework and experiences should be for vocational teacher education programs at their particular institutions. This mix should logically emerge from a close examination of vocational teacher preparation's current status as well as the evolving nature of the workplace (Bailey, 1990; Lotto, 1988; Rosenfield, 1988), vocational education teachers' changing professional roles (Finch, 1991; Lynch, 1990), and philosophical and knowledge base considerations (Griggs & Burnham, 1988; Lynch & Griggs, 1989).

Thus, the objective of this study was to document coursework graduates completed during their university vocational teacher preparation studies. More specifically, we sought answers to the following questions:

1. What types and amounts of coursework do prospective vocational education teachers take as part of their teacher preparation (i.e., mathematics and computer science; social science; language, fine arts, philosophy, and other humanities; teaching content area; and education)?

2. To what extent does coursework taken vary as a function of teaching major (i.e., agriculture, business, home economics, marketing, technology [formerly industrial arts], and trade and industrial education)?

3. What is the mathematics, science, and English coursework preparation of prospective vocational education teachers?

4. How does the preparation of vocational teachers compare with that of teachers reported in other studies (i.e., Galambos, Cornett, & Spitler, 1985; Koerner, 1963)?

ASSUMPTIONS

This study is based on several assumptions associated with university course taking. These assumptions include the following:

- Course taking can provide the student with a body of specific knowledge that, in turn, serves as a prerequisite to postuniversity employment success. This in no way infers a causal relationship between course taking and employment success. Additionally, no assumption is made that teachers only learn content by taking university courses.

- Lower-level (or lower-division) university courses serve as foundations and prerequisites for enrollment in upper-level courses. As such, lower-level general education studies can provide foundational knowledge for both upper-level general education and teaching-major courses.

LIMITATIONS

There are several limitations associated with this study. They include the following:

- The institutions that participated in this study consisted of selected universities in Southern Regional Education Board (SREB) member states. The population of universities from which the actual participant institutions were drawn represent the southern United States. Any inferences to institutions beyond those involved in this study should be made with caution.

- Not all vocational teachers enter the profession via traditional baccalaureate-degree teacher education programs. The findings of this study, therefore, may not be applicable to vocational teacher education programs that provide capstone experiences for persons who already have completed baccalaureate degrees in other fields (e.g., agriculture, business administration, and marketing).

- This study did not examine course-taking patterns of nondegreed vocational teachers. Since health and trade and industrial occupations teachers do not typically have bacclaureate degrees, study results should not be applied to the nondegreed segment of vocational education teachers.

- Because of limited resources, health occupations teachers were not included in this study. Study results should not, therefore, be applied to this teacher group.

- This study provides a "snapshot" or one-time view of the preparation of a group of vocational teacher education baccalaureate degree recipients who graduated during the 1988-1989 school year. As such, it neither focuses on longitudinal changes nor employment-related success factors.

METHOD

Typically, any analysis of educational coursework is constrained by access to transcripts. National Center for Research in Vocational Education (NCRVE) researchers overcame this problem through collaboration with the Southern Regional Education Board (SREB). The SREB is linked closely to states and universities in the southeastern United

States and, thus, has access to many types of institutional information. Essentially, the methodology used in the present study paralleled research conducted by SREB and funded by the National Endowment for the Humanities (NEH) (Galambos et al., 1985). This approach permitted comparisons to be made between the results of the present study and results of the earlier study. The SREB/NEH study focused on an analysis of transcripts of arts and sciences teaching graduates and arts and science graduates. The present study extends our knowledge about preparation for teaching through transcript analysis of vocational teacher education graduates.

Initially, NCRVE and SREB convened a steering group for the purpose of identifying universities that might participate in the study and assisting in formulating more detailed research questions. The steering group consisted of vocational education professionals in state departments of education, vocational teacher education programs, and local education agencies.

From among SREB member states, institutions were identified that offered degrees leading to certification as vocational education teachers. Information provided in a vocational teacher education database was used to determine which institutions were, in fact, offering degrees (Lynch, 1990). Institutions producing the largest number of vocational education teachers were identified to serve as a pool from which participating institutions would be chosen. From this pool, the largest producer of vocational teachers from each of several subject areas (i.e., agriculture, business, home economics, marketing, technology, and trade and industrial) was asked to participate. Additional institutions were then selected with consideration given to geographical representation, quantity of teachers produced, teaching area(s) for which teachers are prepared, and reasonably equal distribution of teacher areas. A total of twenty-eight institutions were then contacted by SREB and asked to participate. Transcripts for 1988-1989 vocational education graduates were obtained from each of twenty-two institutions that elected to participate in the study.

A coding form was developed that took into account individual university courses in relation to general course groupings. This form, together with an institution background information form, was adapted from the earlier SREB study and modified based on input from the project steering group, information provided by individual institutions, and an examination of institution catalogs (see Appendices B and C). Additionally, a set of coding rules (Appendix C) was prepared to guide researchers in their coding decisions. The rules

focused on areas where coders would need to clarify categories in which specific courses should be placed. The form and rules were used by independent coders to code transcripts from several vocational teaching areas. Coders then met, compared their results, and discussed areas of needed clarification. This process continued until the form and rules provided an objective means of coding transcripts. After transcripts were examined and coded, relevant transcript information was entered onto computer discs for later analysis. From the twenty-two universities that participated in the study, 544 transcripts were submitted and 412 of these were coded. The remaining 132 were not coded for one or more of the following reasons: (1) transcripts were incomplete, (2) graduates lacked student teaching, (3) courses transferred were not identified, (4) graduates were not education majors, or (5) graduates were health occupations teachers (and health occupations teachers were not included in this study). A listing of the participating institutions is provided as Appendix E, and a listing of the numbers of teachers by institution and teaching area is included in Appendix F. It should be noted that only nine institutions provided transcripts for marketing education and trade and industrial education and two institutions provided 27.7% of the total transcripts for these areas. For some programs, only one transcript per institution was analyzed.

Data was analyzed using standard statistical packages available for use with microcomputers. Means, ranges, and percentages were computed for course credits taken in various categories (e.g., mathematics, social science, and science) and by teaching area. Comparisons were made among teaching majors in terms of the amount of coursework taken. All course credits were reported as semester hours; remedial courses were excluded from the analyses.

Computer science credits were combined with mathematics since they are often used in meeting the mathematics teaching endorsement. The category of science included all the natural sciences in order to permit comparison with the earlier SREB study.

After tables were prepared from the data, researchers met with the steering group and SREB officials to present their findings. Those attending the meeting provided much useful input for clarifying the results and drawing conclusions from the data.

RESULTS

This research focused on determining the courses completed by vocational education teachers during their teacher preparation studies. The presentation of results is organized around the four questions addressed in the study. Tables referenced in this section may be found in Appendix A.

Question One — Types and Total Credits of Coursework

The first research question asked, "What types and amounts of coursework do prospective vocational education teachers take as part of their teacher preparation (i.e., mathematics and computer science; social science; English; science; language, fine arts, philosophy, and other humanities; teaching content area; and education)?" The coursework completed by prospective vocational teachers is shown in Table 1. (See Appendix G for the coursework completed in each teaching major.) The prospective teachers completed an average of 59.7 semester hours in general studies (the first five coursework areas in Table 1) or 40.8% of the total credits. These credits tended to be at the lower level. About thirty percent of the coursework in general studies was transferred from other institutions.

The teachers completed an average of 50.4 semester hours or 34.4% of the total credits in the teaching major. Most of the teaching area-related content was taken outside of education and at the institutions where the degrees were awarded.

In the coursework area of education, graduates completed 28.7 semester hours or 19.6% of the total credits. About one-third of the credits in education were earned in practicum or student teaching. The remaining credits (7.7 hours or 5.3% of the total) were earned in physical education and health, designated other, or work not classified in a coursework area. Information about types and total credits transferred is presented in Tables 2, 3, and 4.

Question Two — Coursework Taken by Teaching Major

The second research question asked "To what extent does coursework taken vary as a function of teaching major (i.e., agriculture, business, home economics, marketing, technology, and trade and industrial education)?"

To answer this question, credits and percentages of total coursework taken in three main categories were compiled for prospective vocational teachers in each of the six teaching areas. The three categories were general studies, technical content of teaching area, and education. The general studies coursework was further subdivided into the categories of mathematics and computer science; social science; science; English; and language, fine arts, philosophy, and other humanities.

General Studies Credits

Tables 5, 6, and 7 provide the overall picture for the general studies coursework completed by prospective teachers. As shown in Table 5, the average general studies credits earned for the 412 transcripts analyzed was 59.7, or 40.7% of the credits completed. For the six vocational areas, the range in general studies credits earned was from 38.5% to 42.6% of their programs, with technology majors at the low end and business majors at the high end. The average number of credits earned ranged from 55.1 to 63.5. The business majors completed 8.4 credits, or roughly three more courses in general studies credits than the trade and industrial majors. Thus, the spread across the service areas for total general studies credits earned was minimal, especially when compared to the total credits in the programs, which ranged from 140.6 for prospective trade and industrial teachers to 148.7 for prospective business teachers (see Appendix F).

Table 6 contains the breakdown for general studies coursework completed at the lower level, while Table 7 contains similar information for coursework completed at the upper level. As might be anticipated, most of the general studies credits were earned at the lower level—an average of 54.9 credits, with an average of only 4.8 credits at the upper level. Lower-level credits in general studies ranged from 50.0 (34.8%) for the technology majors to 59.2 (39.9%) for the business majors. Thus, the business majors completed roughly three more courses in lower-level general studies than the technology majors. The range for the 3.4% of the general studies credits completed at the upper level was minimal

across the vocational teaching areas, ranging from 4.3 credits completed by the business majors to 5.6 credits completed by the home economics majors.

Mathematics and Computer Science Credits

For a number of the institutions that supplied transcripts, computer science coursework could be used for mathematics credits. Thus, credits earned in mathematics and computer science were combined in this study. General studies represent 40.8% of the total credit. Of the 40.8%, 5.7% were earned in mathematics and computer science courses (see Table 5). As shown in Table 8, the range for the six vocational areas was from 6.7 credits for home economics majors to 10.3 credits for business majors. This translates to 4.5% of total credits for the home economics majors and to 6.9% of total credits for the business majors. As for the percent of prospective teachers earning at least twelve credits in mathematics, the range is from 9.3% for technology education majors to 39.1% for business majors.

For Table 8, which provides details about course-taking patterns in mathematics and computer science, a benchmark of those earning twelve or more credits is provided. The twelve or more credits line on the table allows for comparison to the Galambos et al. (1985) study findings. The tables that follow, detailing general studies credits earned, also contain information according to percent of majors earning twelve or more credits.

Social Science Credits

Details regarding credits earned and percentages of the total coursework they represent in social science courses are presented in Table 9. Social science credits represent about one-third of the total general studies credits earned. Average social science credits earned ranged from 15.9 for the agriculture majors to 24.4 for the marketing majors, from 10.8% to 17.0% of total credits earned. The average percent earning at least twelve credits in social science was 94.4%, with a range from 85.4% for the agriculture majors to 100.0% for the marketing majors.

Science Credits

Table 10 contains the breakdown of credits earned in science by prospective teachers in the six vocational teaching areas. Of the 40.8% of credits represented by general studies coursework, science courses represented about one-sixth of them. The

range for science courses taken by majors in the six areas was from 7.6 credits for the marketing majors to 15.5 credits by the agriculture majors, from 5.3% to 10.6% of the total program. The range for prospective teachers earning an average of at least twelve science credits was from 4.4% for the marketing majors to 79.3% for the agriculture majors. These were the two extremes. At least 46.0% of the home economic majors had earned twelve or more credits in science, and the range for the other three service areas was from 18.1% for business majors to 26.5% for the trade and industrial majors. Looking at the breakdown for coursework taken according to type of science, most was completed in the biological sciences, ranging from 3.5 credits for the trade and industrial majors to 7.8 credits for the agriculture majors. The agriculture and home economics majors differed from the other majors in coursework completed in chemistry. They earned an average of 6.3 and 5.2 credits, respectively; while the other majors averaged only 0.4 to 1.2 credits in chemistry.

English Credits

Information regarding number of credits and percentage of English credits earned by majors in the six vocational areas is shown in Table 11. English credits represented about one-fifth of the 40.8% of general studies credits earned. English credits ranged from 9.9 for trade and industrial majors to 13.0 for home economics majors, representing from 7.0% to 8.8% of the total program (see Table 5). As shown in Table 11, total credits earned in composition ranged from 6.2 for the trade and industrial majors to 7.1 for the home economics majors. For the trade and industrial majors, 26.5% earned at least twelve credits in English, while the range for majors in the other five areas was from 50.0% for technology education majors to 73.7% for business majors.

Language, Fine Arts, Philosophy Credits, and Other Humanities

Table 12 contains information regarding credits earned in languages, fine arts, philosophy, and other humanities, which represented about one-seventh of 40.8% of general studies credits earned. Credits earned in these courses ranged from 7.2 for the agriculture majors to 9.9 for the home economics majors, from 4.9% to 6.7% of the total credits for these majors. The percent of the prospective teachers earning at least twelve credits in these courses ranged from 14.6% for agriculture majors to 26.5% for trade and industrial majors. Most of the credits were in fine arts with an average of 3.2 credits or other humanities with an average of 3.6 credits.

Technical Content in Teaching Major Credits

A breakdown of coursework completed in the technical content related to the teaching major for the prospective teachers in the six vocational areas appears in Table 13. These courses represented, on the average, 34.4% (50.4 credits) of the coursework completed. The range was from 31.3% for the marketing majors to 38.0% for the agriculture majors. The total credits earned ranged from 44.8 for the marketing majors to 55.7 for the agriculture majors. Approximately half of the credits were earned at the lower level and half at the upper level, 23.0 and 27.4 respectively. The bulk of this coursework was completed outside of education; however, since some of the content needed by vocational majors is not offered elsewhere, it is taught by vocational teacher educators in courses with education prefixes. Credits for content courses earned outside education ranged from 25.2 for the trade and industrial majors to 49.1 for home economics majors. Credits for content courses earned with education prefixes ranged from 3.6 for business majors to 17.4 for the technology majors. Technical credit earned through exams and through coursework completed at other institutions was minimal, averaging 0.6 for each major.

Education Credits

Table 14 details credit hours earned in education by the prospective teachers in the six vocational areas. Education credits represented 19.6% of the total credits earned, with the range being from 17.7% (25.9 credits) for the agriculture majors to 22.2% (31.8 credits). The trade and industrial majors had 25.9 credits, which represented 18.4% of their total program. Of these totals, student teaching represented from 8.9 credits for the trade and industrial majors to 10.0 credits for the marketing majors. Additionally, in-school practicums represented from 1.0 credits for technology education majors to 1.9 credits for marketing majors. Methods credits earned in teaching major education courses ranged from 4.1 for agriculture majors to 7.4 for marketing majors. Credits earned in general education methods courses ranged from 1.7 for trade and industrial majors to 3.5 for business majors. An average of 9.3 credits were earned in other education courses, which included studies in educational foundations and educational psychology. The range for credits earned in these other education courses was from 7.5 for trade and industrial majors to 10.3 for marketing majors.

A summary of the coursework credits taken by teaching majors for the broad categories of general studies, teaching major, education, and other coursework appears

below. Business and marketing majors had the least credits in teaching major, 47.8% and 44.8%, explainable by the fact that economics courses are counted as general studies. Differences within the other category were related to numbers of physical education and health credits earned.

Major (in Education)	Credits				
	General Studies	Teaching		Other	Total
		Major	Education		
Agriculture	57.7	55.7	26.0	7.4	146.8
Business	63.5	47.8	31.2	6.2	148.7
Home Economics	60.0	53.3	26.5	7.8	147.6
Marketing	59.1	44.8	31.8	7.5	143.2
Technology	55.4	50.5	27.5	10.7	144.1
Trade and Industrial	55.1	49.1	25.9	10.5	140.6

Question Three — Mathematics, Science, and English Coursework

The third question asked, "What is the mathematics, science, and English coursework preparation of prospective vocational teachers?" To answer this question, the credits earned in mathematics and computer science, science, and English as well as in the technical content of the major by the prospective teachers for each of the six vocational areas were examined. Considering only credits earned in courses with mathematics and computer science, science, and English prefixes provides a limited picture of the extent of preparation prospective teachers had for teaching the academic skills related to these three disciplines.

Data compiled for answering the question appears in Tables 8, 10, 12, and 13, which were previously discussed as part of the findings for question two. The following are summary listings for mathematics and computer science, science, English, and technical content credits earned by majors for each of the six vocational areas. The summary listings for mathematics and computer science, science, and English also provide percentages for majors in the six vocational areas who earned at least twelve credits in each discipline. For the technical content listing, credits earned at both the upper and lower level are summarized for each of the six vocational areas.

Major (in Education)	Mathematics and Computer Science Credits	Percent Earning At Least Twelve Credits
Agriculture	7.9	12.2
Business	10.3	39.1
Home Economics	6.7	9.5
Marketing	7.9	17.4
Technology	7.6	9.3
Trade and Industrial	7.5	17.7

Major (in Education)	Science Credits	Percent Earning At Least Twelve Credits
Agriculture	15.5	79.3
Business	8.8	18.1
Home Economics	11.5	46.0
Marketing	7.6	4.4
Technology	9.3	24.1
Trade and Industrial	9.5	26.5

Major (in Education)	English Credits	Percent Earning At Least Twelve Credits
Agriculture	11.2	55.4
Business	12.5	73.7
Home Economics	13.0	66.7
Marketing	11.3	56.5
Technology	11.2	50.0
Trade and Industrial	9.9	26.5

Major (in Education)	Credits		
	Technical Content	Level	
		Lower	Upper
Agriculture	55.7	23.8	31.9
Business	47.8	22.2	25.6
Home Economics	53.3	24.7	28.6
Marketing	44.8	18.3	26.5
Technology	50.5	21.9	28.6
Trade and Industrial	49.1	28.3	20.8

For agriculture and home economics, the prospective teachers completed 7.9 and 6.7 credits, respectively, in mathematics and computer science. As for science courses, the agriculture majors averaged 15.5 credits while the home economics majors averaged 11.5 credits. Further, more than half of the 55.7 credits for agriculture majors and 53.3 credits for home economics majors earned in the technical content courses were at the upper level.

A similar analogy can be made for the mathematics and computer science and English credits earned by the business and marketing majors, which were 10.3 and 7.9, respectively, for mathematics and computer science and 12.5 and 11.3 for English. In addition, the prospective teachers in business completed 47.8 credits in their technical content area while those in marketing completed 44.8 credits.

As for the technology education and trade and industrial majors, examination of the mathematics and computer science, science, and English credits completed reveals a picture similar to that of the credits completed by majors in the other four vocational areas. Again, preparation in the content areas was substantial, averaging 50.5 credits for the technology education majors and 49.1 credits for the trade and industrial majors.

Since science credits cover the broad spectrum of biological sciences, physics, astronomy, chemistry, and other physical sciences, a more detailed examination of the science coursework completed is warranted. Information about specific science credits earned by major appears in Table 10. Of the combined average of 10.5 science credits, the most were earned in biology, ranging from 3.5 credits for the trade and industrial majors to 7.8 credits for the agriculture majors. For the agriculture and home economics majors, 6.3 and 5.2 credits, respectively, were also earned in chemistry.

The listing below provides a summary of the credits earned in mathematics and computer science, science, English, and technical content by majors in each of the six vocational areas as well as credits earned in their content-related courses. The total credits earned in all four course categories is also provided. Combined credits associated with the three academic disciplines ranged from 71.6 for the marketing majors to 90.3 for the agriculture majors.

Major (in Education)	Credits				
	Mathematics and Computer Science	Science	English	Technical Content	Total
Agriculture	7.9	15.5	11.2	55.7	90.3
Business	10.3	8.8	12.5	47.8	79.4
Home Economics	6.7	11.5	13.0	53.3	84.5
Marketing	7.9	7.6	11.3	44.8	71.6
Technology	7.6	9.3	11.2	50.5	78.6
Trade and Industrial	7.5	9.5	9.9	49.1	76.0

Question Four — Comparison of Courses Taken

The fourth question asked, "How does the preparation of vocational teachers compare with that of teachers reported in other studies (i.e., Galambos, et al., 1985; Koerner, 1963)?" As shown in Table 15, the results of the present study were compared with the findings of studies by Koerner (1963) and the SREB Study Group, 1982-1983 (Galambos et al., 1985). The coursework taken in mathematics, social science, science, and English by vocational teacher undergraduates compared favorably with general teacher undergraduates and arts and sciences undergraduates. The arts and sciences undergraduates completed more courses in language, fine arts, philosophy, and other humanities. The education and student teaching coursework hours were similar for general teacher and vocational teacher groups.

DISCUSSION AND IMPLICATIONS

The average hours completed by vocational teachers in all six majors exceeded the 126 semester hours typically required for graduation. Teachers in this study completed the equivalent of four-and one-half to five-year programs.

Although the range of general studies course taking across the various teacher groups was not great, several concerns may be raised about specific areas within general studies coursework. It is clear that few upper-level general studies courses were completed by the graduates. Our study did not seek reasons behind course-taking patterns; however,

regardless of the reasons teachers may have for not taking many upper-level general studies courses, these upper-level courses have much potential for contributing to a knowledge base for teaching in an increasingly technological world. Teacher educators would do well to review the upper-level course-taking patterns of their students and ensure that prospective teachers are not missing out on opportunities to enrich the general studies component of their programs.

The mathematics, social science, science, and English credits earned appeared, in some cases, to parallel minimum graduation requirements rather than ensure that "coursework in general education, specialty studies, and professional studies complement each other" (National Council for Accreditation of Teacher Education, 1990, p. 45). For example, only 9.3% of the technology education majors earned at least twelve or more credits in mathematics. With the exception of agriculture and home economics majors, teachers averaged only 0.4 to 1.2 credits in chemistry. These examples as well as others in the results section point to potential general education course deficiencies in vocational teachers' undergraduate programs. This is of particular concern if these graduates begin their careers by working with teachers of mathematics, science, and other general areas in the integration of vocational and academic education. Currently and for the future, it appears that greater mathematics and science emphasis is being incorporated into vocational education-related occupations. This trend and the data presented in this study suggest that teacher educators reconsider the mathematics and science requirements currently in place for vocational teacher education majors. Persons who prepare vocational teachers cannot assume that minimum general education requirements for university graduation may also serve as maximum requirements for teacher preparation.

When the results of the present study were compared with earlier studies it was found that mathematics, social science, science, and English coursework taken by vocational teacher undergraduates was similar to general teacher undergraduates and arts and sciences undergraduates. However, this similarity in general studies coursework between the current group of teachers and teachers in other studies does not necessarily reflect what should be. In his 1963 study, Koerner raises the question "How much coursework is enough?" Although Koerner indicates that such a question "can probably never be answered in such a way that will satisfy most of the interests involved" (p. 154), he makes a convincing case that teachers at that time did not have adequate preparation in the general studies area. This concern is likewise reflected in the SREB study (Galambos

et al., 1985) where the authors conclude that there is a "need to improve the general education component of the baccalaureate for all students" (p. 91). It might be inferred that since the student comparison groups were felt by their respective study authors to have less than adequate preparation in general education studies, the current teacher group likewise does not measure up in this area. At the very least, it is suggested that teacher educators systematically assess the course-taking patterns of prospective vocational education teachers at their institutions and determine whether general education studies requirements are sufficient to provide program graduates with mathematics, social science, science, and English capabilities for functioning effectively in their professional roles. This is of particular importance since many vocational education teachers will be employed by school districts that require them to work closely with teachers of academic subjects in the integration of vocational and academic education

The procedures used in this study give an *expost facto* look at what the preparation of vocational teachers has been. The outcomes provide a basis for assessing how well teachers have been prepared, thus establishing a starting point for determining needed changes in coursework requirements. Further, institutions with teacher education programs can use the study outcomes to determine how their own programs compare with those of the twenty-two teacher preparation institutions included in the study.

Although the methodology used in this study was cumbersome and very time consuming, it was found that transcript analysis revealed information about students' course-taking patterns that was heretofore unavailable. Teacher education institutions should consider the possibility of periodically conducting transcript analyses of their graduates in order to obtain a more complete picture of the courses vocational teacher education majors take. This information may, in turn, provide faculty members with useful input for future decisions related to vocational teacher education curricula.

REFERENCES

Bailey, T. (1990). Jobs of the future and the skills they will require. *American Educator, 14*(1), 10-15, 40-44.

Beyer, L. E., Feinberg, W., Pagano, J., & Whitson, J. A. (1989). *Preparing teachers as professionals: The role of educational studies and other liberal disciplines.* New York, NY: Teachers College Press.

Carnegie Forum on Education and the Economy. (1986). *A nation prepared: Teachers for the 21st Century.* New York, NY: Carnegie Corporation.

Diegmueller, K. (1991, February 20). Two Oregon colleges may abolish teacher preparation. *Education Week*, p. 5.

Finch, C. R. (1991, March). *Teacher preparation, qualifications, and demand.* Paper prepared for the National Assessment of Vocational Education Design Conference, Washington, DC.

Galambos, E. C., Cornett, L. M., & Spitler, H. D. (1985). *An analysis of transcripts of teachers and arts and sciences graduates.* Atlanta, GA: Southern Regional Education Board.

Griggs, M. B., & Burnham, C. (1988). The knowledge base for the redesign of vocational teacher education. In J. Washburn (Ed.), *Beyond the debate: Perspectives on the preparation of vocational education teachers* (pp. 66-81). Macomb: Curriculum Publications Clearinghouse, Western Illinois University.

Holmes Group. (1986). *Tomorrow's teachers: A report of the Holmes Group.* East Lansing, MI: Author.

Koerner, J. D. (1963). *The miseducation of teachers.* Boston, MA: Houghton Mifflin.

Lotto, L. S. (1988). What about vocational education: A review of the evidence. *Educational Policy, 2*(3), 265-285.

Lynch, R. L. (1990). *A national database on vocational teacher education.* Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Lynch, R. L., & Griggs, M. B. (1989). *Vocational teacher education: A context for the future.* Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

National Commission on Secondary Vocational Education. (1985). *The unfinished agenda: The role of vocational education in the high school.* Columbus: National Center for Research in Vocational Education, Ohio State University.

National Council for Accreditation of Teacher Education. (1990). *Standards, procedures, and policies for the accreditation of professional education units.* Washington, DC: Author.

Rosenfeld, S. A. (1988, June 22). Educating for factories of the future. *Education Week*, p. 48.

Appendix A

Tables Related to Study Results

Table 1

Types and Total Credits of Coursework Completed by Prospective Vocational Teachers (n = 412)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics & Computer Science	8.2	0.2	2.5	0.1	8.4
Social Science	18.2	2.3	6.0	0.3	20.5
Science	10.4	0.1	3.1	0.0	10.5
English	10.8	1.1	3.9	0.1	11.9
Language, Fine Arts, Philosophy, and Other Humanities	7.3	1.1	2.3	0.1	8.4
Physical Education & Health	4.3	0.7	1.2	0.1	5.0
Teaching Major					
Content in education[b]	1.1	7.0	0.0	0.1	8.1
Content outside education[c]	20.7	20.4	5.7	2.0	41.1
Equivalent technical credit	0.6[e]	—	0.5	—	0.6
Technical credit by exam	0.6[e]	—	0.1	—	0.6
Education					
General Methods	0.2	2.5	0.0	0.0	2.7
Methods in teaching major	0.2	5.6	0.0	0.0	5.8
Practicum	0.4	1.0	0.0	0.0	1.4
Student teaching	—	9.5	—	0.0	9.5
Other[d]	1.6	7.7	0.1	0.1	9.3
Designated other[f]	1.6	0.4	0.8	0.1	2.0
Not classified	0.6	0.1	0.2	0.0	0.7
Total average credits	86.8	59.7	26.5	3.0	146.5

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education includes courses related to the technical field of a prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level because they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

BEST COPY AVAILABLE

Table 2

Transfer Credit Patterns of Prospective Vocational Teachers

Category	Number or Percent
Teachers with	
Transferred credit	264
No transferred credit	148
Percent of teachers transferring credit	64.1
Average number of hours transferred	29.5
Average percent of total credits transferred	20.1

Table 3

Distribution of Prospective Vocational Teachers by Number of Transferred Hours (n = 264)

Number of hours	Number of teachers	Percent of teachers[a]
1 – 15	66	25.0
16 – 30	27	10.2
31 – 45	30	11.4
46 – 60	53	20.1
61 – 75	51	19.3
76 – 90	18	6.8
91 – 105	8	3.0
106 – 120	4	1.5
121 – 135	4	1.5
136 – 140	3	1.1

[a] Total does not equal 100 due to rounding.

Table 4

Distribution of Prospective Vocational Teachers by Percent of Total Credits Transferred (n = 264)

Percent of total credits	Number of teachers
1 – 10	65
11 – 20	24
21 – 30	28
31 – 40	39
41 – 50	63
51 – 60	29
61 – 70	10
71 – 80	6

Table 5

Average General Studies Credits Completed by Prospective Vocational Teachers

Coursework Area	Agriculture (n = 82)		Business (n = 133)		Home Economics (n = 63)		Marketing (n = 46)		Technology (n = 54)		Trade & Industrial (n = 34)		Combined Total (n = 412)	
	Cr[a]	%[b]	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%
Mathematics and Computer Science	7.9	5.4	10.3	6.9	6.7	4.5	7.9	5.5	7.6	5.3	7.5	5.3	8.4	5.7
Social Science	15.9	10.8	24.0	16.1	18.9	12.8	24.4	17.0	18.2	12.6	18.9	13.4	20.5	14.0
Science	15.5	10.6	8.8	5.9	11.5	7.8	7.6	5.3	9.3	6.5	9.5	6.8	10.5	7.2
English	11.2	7.6	12.5	8.4	13.0	8.8	11.3	7.9	11.2	7.8	9.9	7.0	11.9	8.1
Language, Fine Arts, Philosophy, and Other Humanities	7.2	4.9	7.9	5.3	9.9	6.7	7.9	5.5	9.1	6.3	9.3	6.6	8.4	5.7
Total	57.7	39.3	63.5	42.6	60.0	40.6	59.1	41.2	55.4	38.5	55.1	39.1	59.7	40.7

[a] Credit hours

[b] Percent of total credits earned

BEST COPY AVAILABLE

Table 6

Average Lower Level General Studies Credits Completed by Prospective Vocational Teachers

Coursework Area	Agriculture (n = 82)		Business (n = 133)		Home Economics (n = 63)		Marketing (n = 46)		Technology (n = 54)		Trade & Industrial (n = 34)		Combined Total (n = 412)	
	Cr[a]	%[b]	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%
Mathematics and Computer Science	7.7	5.2	9.9	6.7	6.6	4.5	7.8	5.4	7.6	5.3	7.5	5.3	8.2	5.6
Social Science	13.7	9.3	22.2	14.9	16.7	11.3	22.0	15.4	14.8	10.3	16.5	11.7	18.2	12.4
Science	15.5	10.6	8.8	5.9	11.5	7.8	7.6	5.3	9.3	6.5	9.5	6.8	10.5	7.2
English	10.5	7.2	11.1	7.5	11.8	8.0	10.2	7.1	10.5	7.3	9.2	6.5	10.8	7.4
Language, Fine Arts, Philosophy, and Other Humanities	6.0	4.1	7.3	4.9	7.8	5.3	7.3	5.1	7.8	5.4	8.3	5.9	7.3	5.0
Total	53.1	36.2	59.2	39.9	54.4	36.9	54.7	38.2	50.0	34.8	50.7	35.9	54.9	37.5

[a] Credit hours

[b] Percent of total credits earned

Table 7

Average Upper-Level General Studies Credits Completed by Prospective Vocational Teachers

Coursework Area	Agriculture (n = 82)		Business (n = 133)		Home Economics (n = 63)		Marketing (n = 46)		Technology (n = 54)		Trade & Industrial (n = 34)		Combined Total (n = 412)	
	Cr[a]	%[b]	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%
Mathematics and Computer Science	0.2	0.1	0.4	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1
Social Science	2.2	1.5	1.8	1.2	2.2	1.5	2.4	1.7	3.4	2.4	2.4	1.7	2.3	1.6
Science	15.5	10.6	8.8	5.9	11.5	7.8	7.6	5.3	9.3	6.5	9.5	6.8	10.5	7.2
English	0.7	0.5	1.4	0.9	1.2	0.8	1.1	0.8	0.7	0.5	0.7	0.5	1.1	0.8
Language, Fine Arts, Philosophy, and Other Humanities	1.2	0.8	0.6	0.4	2.1	1.4	0.6	0.4	1.3	0.9	1.0	0.7	1.1	0.8
Total	4.6	3.1	4.3	2.9	5.6	3.8	4.4	3.1	5.4	3.8	4.4	3.1	4.8	3.4

[a] Credit hours

[b] Percent of total credits earned

Table 8

General Studies: Mathematics and Computer Science

	Agriculture (n = 82)	Business (n = 133)	Home Economics (n = 63)	Marketing (n = 46)	Technology (n = 54)	Trade & Industrial (n = 34)	Combined Total (n = 412)
Average total credits	7.9	10.3	6.7	7.9	7.6	7.5	8.4
Average total lower-level credits	7.7	9.9	6.6	7.8	7.6	7.5	8.2
Average total upper-level credits	0.2	0.4	0.1	0.1	0.0	0.0	0.2
Average percent of total credit	5.4	6.9	4.5	5.5	5.3	5.3	5.7
Percent earning at least twelve credits	12.2	39.1	9.5	17.4	9.3	17.7	21.1
Percent earning upper-level credit	2.7	4.3	2.1	1.4	0.5	0.0	2.6

BEST COPY AVAILABLE

Table 9

General Studies: Social Science

	Agriculture (n = 82)	Business (n = 133)	Home Economics (n = 63)	Marketing (n = 46)	Technology (n = 54)	Trade & Industrial (n = 34)	Combined Total (n = 412)
Average total credits	15.9	24.0	18.9	24.4	18.2	18.9	20.5
Average total lower-level credits	13.7	22.2	16.7	22.0	14.8	16.5	18.2
Average total upper-level credits	2.2	1.8	2.2	2.4	3.4	2.4	2.3
Average credits							
Economics	2.0	6.5	2.0	5.7	2.0	3.9	4.0
History	4.9	5.3	5.1	4.7	6.8	5.6	5.3
Political Science	2.5	2.2	2.7	2.2	1.8	2.0	2.2
Psychology	3.6	4.8	5.0	5.1	4.0	3.9	4.5
Sociology	2.5	2.6	3.0	2.7	2.1	2.3	2.5
Other (e.g., Anthropology, Geography)	0.4	2.6	1.1	4.0	1.5	1.2	2.0
Average percent of total credit	10.8	16.1	12.8	17.0	12.6	13.4	14.0
Percent earning at least twelve credits	85.4	99.3	98.4	100.0	88.9	91.2	94.4
Percent earning upper-level credit	13.9	7.7	11.5	9.7	18.7	12.7	11.1

Table 10

General Studies: Science

	Agriculture (n = 82)	Business (n = 133)	Home Economics (n = 63)	Marketing (n = 46)	Technology (n = 54)	Trade & Industrial (n = 34)	Combined Total (n = 412)
Average total credits	15.5	8.8	11.5	7.6	9.3	9.5	10.5
Average total lower-level credits	15.2	8.7	11.5	7.4	9.3	9.2	10.4
Average total upper-level credits	0.3	0.1	0.0	0.2	0.0	0.3	0.1
Average credits with laboratory	12.7	6.8	8.0	6.1	6.4	5.6	8.0
Average credits							
Biological Sciences	7.8	4.9	4.7	4.1	3.9	3.5	5.1
Physics and Astronomy	1.0	0.9	1.0	0.3	3.1	1.1	1.2
Chemistry	6.3	0.4	5.2	0.7	1.2	0.9	2.5
Other (e.g., Physical and Earth Science, Geology)	0.4	2.6	0.6	2.5	1.1	4.0	1.7
Average percent of total credit	10.6	5.9	7.8	5.3	6.5	6.8	7.2
Percent earning at least twelve credits	79.3	18.1	46.0	4.4	24.1	26.5	34.5
Percent earning upper-level credit	2.2	0.1	0.0	2.9	0.0	2.7	1.1

Table 11

General Studies: English

	Agriculture (n = 82)	Business (n = 133)	Home Economics (n = 63)	Marketing (n = 46)	Technology (n = 54)	Trade & Industrial (n = 34)	Combined Total (n = 412)
Average total credits	11.2	12.5	13.0	11.3	11.2	9.9	11.9
Average total lower-level credits	10.5	11.1	11.8	10.2	10.5	9.2	10.8
Average total upper-level credits	0.7	1.4	1.2	1.1	0.7	0.7	1.1
Average credits in composition	6.7	6.6	7.1	6.3	6.5	6.2	6.6
Average percent of total credit	7.6	8.4	8.8	7.9	7.8	7.0	8.1
Percent earning at least twelve credits	55.4	73.7	66.7	56.5	50.0	26.5	59.5
Percent earning upper-level credit	6.3	11.4	9.2	10.0	6.6	6.6	9.0

Table 12

General Studies: Fine Arts, Language, Philosophy, and Other Humanities

	Agriculture (n = 82)	Business (n = 133)	Home Economics (n = 63)	Marketing (n = 46)	Technology (n = 54)	Trade & Industrial (n = 34)	Combined Total (n = 412)
Average total credits	7.2	7.9	9.9	7.9	9.1	9.3	8.4
Average total lower-level credits	6.0	7.3	7.8	7.3	7.8	8.3	7.3
Average total upper-level credits	1.2	0.6	2.1	0.6	1.3	1.0	1.1
Average credits							
Fine Arts[a]	2.2	3.3	3.6	2.8	4.4	2.9	3.2
Foreign Language	0.4	0.9	1.2	0.7	0.3	0.3	0.7
Philosophy	0.8	0.5	0.9	0.5	1.3	1.8	0.9
Other Humanities[b]	3.8	3.2	4.2	3.9	3.1	4.3	3.6
Average percent of total credit	4.9	5.3	6.7	5.5	6.3	6.6	5.7
Percent earning at least twelve credits	14.6	19.6	25.4	26.1	18.5	26.5	20.6
Percent earning upper-level credit	16.0	7.8	21.5	7.2	14.4	10.4	12.8

[a] Fine Arts includes courses in music, art, drama, music history, music theory, art history, art theory, and theater arts.
[b] Other Humanities include communications-related courses, archaeology, classics, linguistics, religion, Latin, and Greek.

BEST COPY AVAILABLE

Table 13

Credits Completed in Technical Content of Teaching Major

Coursework Area	Agriculture (n = 82)		Business (n = 133)		Home Economics (n = 63)		Marketing (n = 46)		Technology (n = 54)		Trade & Industrial (n = 34)		Combined Total (n = 412)	
	Cr[a]	%[b]	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%
Content in education[c]	7.4	5.0	3.6	2.4	4.2	2.8	13.4	9.4	17.4	12.1	12.6	8.9	8.1	5.5
Lower	0.6	0.4	0.5	0.3	0.4	0.3	1.7	1.2	3.1	2.2	1.6	1.1	1.1	0.7
Upper	6.8	4.6	3.1	2.1	3.8	2.5	11.7	8.2	14.3	9.9	11.0	7.8	7.0	4.8
Content outside education[d]	48.3	32.9	43.7	29.4	49.1	33.3	31.2	21.8	32.4	22.5	25.2	18.0	41.1	28.1
Lower	23.2	15.8	21.2	14.3	24.3	16.5	16.4	11.5	18.1	12.6	15.4	11.0	20.7	14.2
Upper	25.1	17.1	22.5	15.1	24.8	16.8	14.8	10.3	14.3	9.9	9.8	7.0	20.4	13.9
Equivalent technical credit[e]	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.1	0.2	0.1	6.3	4.5	0.6	0.4
Technical credit by exam[f]	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.5	0.3	5.0	3.5	0.6	0.4
Total	55.7	38.0	47.8	32.1	53.3	36.1	44.8	31.3	50.5	35.0	49.1	34.9	50.4	34.4
Lower	23.8	16.2	22.2	14.9	24.7	16.7	18.3	12.8	21.9	15.2	28.3	20.1	23.0	15.7
Upper	31.9	21.8	25.6	17.2	28.6	19.4	26.5	18.5	28.6	19.8	20.8	14.8	27.4	18.7

[a] Credit hours

[b] Percent of total credits earned

[c] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[d] Content outside education includes course related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture major).

[e] Technical courses completed at other institutions

[f] Technical course credit awarded on basis of exam

BEST COPY AVAILABLE

Table 14

Credits Completed in Education

Coursework Area	Agriculture (n = 82)		Business (n = 133)		Home Economics (n = 63)		Marketing (n = 46)		Technology (n = 54)		Trade & Industrial (n = 34)		Combined Total (n = 412)	
	Cr[a]	%[b]	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%	Cr	%
General methods[c]	2.7	1.8	3.5	2.4	2.5	1.7	2.2	1.5	2.4	1.6	1.7	1.2	2.7	1.8
Methods in teaching major[d]	4.1	2.8	7.1	4.8	4.2	2.9	7.4	5.2	5.0	3.5	6.0	4.3	5.8	4.0
Practicum	1.4	1.0	1.1	0.7	1.6	1.1	1.9	1.3	1.0	0.7	1.8	1.3	1.4	1.0
Student teaching	9.1	6.2	9.4	6.3	9.6	6.5	10.0	7.0	9.9	6.9	8.9	6.3	9.5	6.5
Other[e]	8.7	5.9	10.1	6.8	8.6	5.8	10.3	7.2	9.2	6.4	7.5	5.3	9.3	6.3
Total	26.0	17.7	31.2	21.0	26.5	18.0	31.8	22.2	27.5	19.1	25.9	18.4	28.7	19.6

[a] Credit hours

[b] Percent of total credits earned

[c] General methods courses or those not specific to vocational education

[d] Includes teaching major courses that use the terms "methods" and/or "teaching" in their titles or descriptions.

[e] Includes courses in educational foundations and educational psychology.

Table 15

Comparison of Courses Taken by Teachers—1963, 1982-1983, and 1988-1989

Coursework Area	Koerner Findings, 1963 Secondary Teachers	SREB Study Group, 1982-1983		NCRVE/SREB Study 1990 Vocational Teachers
		Teachers	Arts and Sciences Graduates	
Mathematics[a]	3	6	7.2	8.4[b]
Social Science[a]	—	21.6	20.4	20.5
Science[a]	11	11.6	12.2	10.5
English[a]	12	11.3	11.8	11.9
Language, Fine Arts, Philosophy, and Other Humanities[a]	—	11.4	17.8	8.4
Education	27.6	28.3[c,d]	—	28.7
Student teaching	7	9[d]	—	9.5

[a] General education
[b] Also includes computer science courses
[c] Excludes addition hours in transferred credits
[d] Secondary teachers only

Appendix B

Institution
Background Information Form

TRANSCRIPT STUDY CONDUCTED BY
THE SOUTHERN REGIONAL EDUCATION BOARD AND
THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION

Specifications for Information Needed

Name of Institution _____

A. *Transcripts of Graduates Eligible for Certification*

For individuals eligible for teacher certification receiving baccalaureate degrees in 1988-1989 (beginning with July 1, 1988 and ending with June 30, 1989), provide transcripts as noted below. You may not have graduates in each of the programs. Further, you may have graduates in the programs where different program names have been used. If the major and area of certification or specialization are not provided on each transcript, please add this information.

Program		Number of 1988-1989 Graduates
1.	Agricultural Education	_____
2.	Business Education	_____
3.	Marketing Education	_____
4.	Home Economic Education	_____
5.	Technology Education (formerly Industrial Arts)	_____
6.	Trade and Industrial Education	_____
	TOTAL	_____

B. *Other Information Needed*

In addition to the above transcripts, please answer the items below and provide catalogs and graduation analyses information as noted. Circle the correct response.

1. Have you converted from quarter to semester hours since 1983-1984? YES NO

2. Have you converted from semester to quarter hours since 1983-1984? YES NO

3. Please provide a copy of your 1988-1989 catalog. If you have converted from semester to quarter or vice versa, please provide a catalog for the year preceding the conversion also.

4. Do students get credit for remedial courses? YES NO

5. Do remedial courses count toward graduation? YES NO

6. Can the remedial courses be identified on the transcript in any way? YES NO

If your answer to #6 is YES, please describe how each individual course can be identified.

_____

_____

_____

_____

_____

_____

_____

7. Is transfer credit shown by individual accepted on the transcript? YES NO

If your answer to #7 is NO, please provide a copy of the analysis form completed for the credit transferred to your institution for each graduate. Transfer credit information for all coursework accepted, including community college courses, is needed.

Please return with transcripts by **April 1, 1990** to

TRANSCRIPT STUDY
ATTN: Gene Bottoms
Southern Regional Education Board
592 Tenth Street, NW
Atlanta, GA 30318

Appendix C

Coding Guide

Transcript Coding Guide

Subject	Course Type	Field #	Rule
Math	Remedial	9	Include math courses that do not count toward a degree
	Level 1	10	Require high school algebra I and II and geometry
	Level 2	11	Require high school algebra I
English & Literature	Remedial	18	Include English courses that do not count toward a degree
Language	Lower	32	Include foreign language courses
	Upper	33	Same as above
	Teacher Only	34	Same as above
Fine Arts	Lower	35	Include courses in music, art, drama, music history, music theory, art history, art theory, and theater arts
	Upper	36	Same as above
	Teacher Only	37	Same as above
Other Social Sciences	Lower	79	Include anthropology and geography
	Upper	80	Same as above
Other Humanities	Lower	81	Include communications-related courses, archaeology, classics, linguistics, religion, Latin, and Greek
	Upper	82	Same as above
	Teacher Only	83	Same as above
Physical Education	Lower	87	Include health-related courses
	Upper	88	Same as above
Education Lower Level	Other Methods	91	Include general methods and audiovisual methods courses
	Other Education	92	Include educational foundations and educational psychology courses
	Practicum	93	Include early field experience; do not include student teaching

Subject	Course Type	Field #	Rule
Education Upper Level	Other Methods	96	Include general methods and audiovisual methods courses
	Other Education	97	Include educational foundations and educational psychology courses
	Practicum	98	Include early field experience; do not include student teaching
Teaching Major Lower Level	Education Methods	120	Include teaching major courses that state "methods" and/or "teaching" in their titles
	Education Content	121	Include all other teaching major courses
	Non-Education Content	122	Code non-education prefix courses as follows: *Business Education* - include all business administration, business law, accounting, marketing, finance, and management science courses *Marketing Education* - same as business education *Agriculture Education* - include all home economics, human development, and human ecology courses *Technology Education* - include all industrial technology and engineering courses *Trade & Industrial* - include all industrial technology and engineering courses
Teaching Major Upper Level	Education Methods	123	Same as #120
	Education Content	124	Same as #121
	Non-Education Content	125	Same as #122
Teaching Major Any Level	Equivalent Technical	126	Include technical course taken at other institution
	Technical Credit by Exam	127	Include technical course credit awarded on basis of exam (e.g., NOCTI)

Subject	Course Type	Field #	Rule
Designated Other Lower Level	Agriculture	128	Include courses outside teaching major not elsewhere classified
	Architecture	129	Same as above
	Business	130	Same as above
	Engineering	131	Same as above
	Human Resources/ Home Economics	132	Same as above
	Other	133	Same as above
Designated Other Lower Level	Agriculture	134	Include courses outside teaching major not elsewhere classified
	Architecture	135	Same as above
	Business	136	Same as above
	Engineering	137	Same as above
	Human Resources/ Home Economics	138	Same as above
	Other	139	Same as above

Appendix D

Participating Institutions

Participating Institutions

Alabama A&M University
Appalachian State University
Clemson University
East Tennessee State University
James Madison University
Louisiana State University
Marshall University
Mississippi State University
Morehead State University
North Carolina State University
Sam Houston State University
Southwest Texas State University
University of Arkansas
University of Central Arkansas
University of Georgia
University of Houston
University of Kentucky
University of Southwest Louisiana
University of Tennessee at Knoxville
University of Tennessee at Martin
Virginia Polytechnic Institute & State University
Virginia State University

Appendix E

Number of Prospective Vocational Teachers by Institution and Vocational Education Area

Table E-1

Number of Prospective Vocational Teachers by Institution and Vocational Education Area

	Teaching Area						
Institution	Agriculture	Business	Home Economics	Marketing	Technology Education	Trade & Industrial	Total
A	4	0	1	0	2	1	8
B	4	18	2	0	0	4	28
C	0	1	5	1	6	0	13
D	11	27	11	10	1	4	64
E	4	6	2	0	0	9	21
F	7	5	6	0	0	0	18
G	1	8	5	0	1	0	15
H	3	4	4	1	1	0	13
I	3	5	0	7	1	0	16
J	0	4	2	2	5	0	13
K	13	0	0	1	5	2	21
L	2	0	0	0	5	1	8
M	0	7	0	0	0	0	7
N	6	3	4	0	8	0	21
O	10	3	8	0	4	2	27
P	5	0	7	0	3	0	15
Q	0	9	0	0	0	0	9
R	0	8	2	7	0	2	19
S	4	15	0	10	12	9	50
T	1	1	2	0	0	0	4
U	0	7	2	7	0	0	16
V	4	2	0	0	0	0	6
Total	82	133	63	46	54	34	412

Appendix F

Types and Total Credits of Coursework
Completed by Prospective Vocational Teachers
in Each Teaching Area

Table F-1

Types and Total Credits of Coursework Completed by Prospective Agricultural Vocational Teachers (n = 82)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	7.7	0.2	2.8	0.1	7.9
Social Science	13.7	2.2	5.4	0.1	15.9
Science	15.2	0.3	5.4	0.2	15.5
English	10.5	0.7	4.3	0.1	11.2
Language, Fine Arts, Philosophy, and Other Humanities	6.0	1.2	2.0	0.1	7.2
Physical Education and Health	3.6	0.4	1.2	0.0	4.0
Teaching Major					
Content in education[b]	0.6	6.8	0.0	0.0	7.4
Content outside education[c]	23.2	25.1	5.7	1.5	48.3
Equivalent technical credit	0.0[e]	—	0.0	—	0.0
Technical credit by exam	0.0[e]	—	0.0	—	0.0
Education					
General Methods	0.5	2.2	0.0	0.0	2.7
Methods in teaching major	0.0	4.1	0.0	0.0	4.1
Practicum	0.3	1.1	0.0	0.1	1.4
Student teaching	—	9.1	—	0.0	9.1
Other[d]	2.0	6.7	0.2	0.2	8.7
Designated other[f]	1.9	0.4	1.3	0.1	2.3
Not classified	1.1	0.0	0.3	0.0	1.1
Total average credits	86.3	60.5	28.6	2.6	146.8

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

BEST COPY AVAILABLE

Table F-2

Types and Total Credits of Coursework Completed by Prospective Business Education Vocational Teachers (n = 133)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	9.9	0.4	2.9	0.1	10.3
Social Science	22.2	1.8	6.8	0.5	24.0
Science	8.7	0.1	2.7	0.1	8.8
English	11.1	1.4	4.0	0.0	12.5
Language, Fine Arts, Philosophy, and Other Humanities	7.3	0.6	2.3	0.1	7.9
Physical Education and Health	4.2	0.5	1.2	0.1	4.7
Teaching Major					
Content in education[b]	0.5	3.1	0.0	0.0	3.6
Content outside education[c]	21.2	22.5	7.8	3.7	43.7
Equivalent technical credit	0.2[e]	—	0.0	—	0.2
Technical credit by exam	0.3	—	0.0	—	0.3
Education					
General Methods	0.2	3.3	0.0	0.0	3.6
Methods in teaching major	0.0	7.1	0.0	0.0	7.1
Practicum	0.5	0.6	0.1	0.0	1.1
Student teaching	—	9.4	—	0.0	9.4
Other[d]	1.7	8.4	0.1	0.1	10.1
Designated other[f]	1.0	0.2	0.2	0.0	1.2
Not classified	0.3	0.0	0.1	0.0	0.3
Total average credits	89.3	59.4	28.0	4.8	148.7

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

Table F-3

Types and Total Credits of Coursework Completed by Prospective Home Economics Education Vocational Teachers (n = 63)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	6.6	0.1	1.6	0.0	6.7
Social Science	16.7	2.2	5.7	0.3	18.9
Science	11.5	0.0	2.8	0.0	11.5
English	11.8	1.2	3.5	0.0	13.0
Language, Fine Arts, Philosophy, and Other Humanities	7.8	2.1	2.6	0.2	9.9
Physical Education and Health	4.1	0.4	0.9	0.0	4.5
Teaching Major					
Content in education[b]	0.4	3.8	0.0	0.0	4.2
Content outside education[c]	24.3	24.8	3.0	1.0	49.1
Equivalent technical credit	0.0[e]	—	0.0	—	0.0
Technical credit by exam	0.0	—	0.0	—	0.0
Education					
General Methods	0.3	2.2	0.0	0.0	2.5
Methods in teaching major	0.0	4.2	0.0	0.0	4.2
Practicum	0.2	1.4	0.0	0.0	1.6
Student teaching	—	9.6	—	0.0	9.6
Other[d]	1.7	6.9	0.4	0.1	8.6
Designated other[f]	2.4	0.2	1.3	0.2	2.6
Not classified	0.7	0.0	0.4	0.0	0.7
Total average credits	88.5	59.1	22.3	1.7	147.6

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

BEST COPY AVAILABLE

Table F-4

Types and Total Credits of Coursework Completed by Prospective Marketing Vocational Teachers (n = 46)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	7.8	0.1	2.1	0.0	7.9
Social Science	22.0	2.4	5.5	0.2	24.4
Science	7.4	0.2	1.7	0.0	7.6
English	10.2	1.1	3.6	0.0	11.3
Language, Fine Arts, Philosophy, and Other Humanities	7.3	0.6	2.2	0.1	7.9
Physical Education and Health	4.4	1.0	1.6	0.1	5.4
Teaching Major					
Content in education[b]	1.7	11.7	0.0	0.0	13.4
Content outside education[c]	16.4	14.8	9.6	2.0	31.2
Equivalent technical credit	0.2[e]	—	0.0	—	0.2
Technical credit by exam	0.0	—	0.0	—	0.0
Education					
General Methods	0.4	1.8	0.0	0.0	2.2
Methods in teaching major	0.0	7.4	0.0	0.0	7.4
Practicum	0.7	1.2	0.2	0.0	1.9
Student teaching	—	10.0	—	0.0	10.0
Other[d]	1.6	8.7	0.0	0.0	10.3
Designated other[f]	0.7	0.3	0.0	0.0	1.0
Not classified	0.8	0.3	0.2	0.0	1.1
Total average credits	81.6	61.6	26.7	2.4	143.2

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

Table F-5

Types and Total Credits of Coursework Completed by Prospective Technology Education Teachers (n = 54)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	7.6	0.0	1.9	0.0	7.6
Social Science	14.8	3.4	5.4	0.2	18.2
Science	9.3	0.0	2.3	0.2	9.3
English	10.5	0.7	3.4	0.0	11.2
Language, Fine Arts, Philosophy, and Other Humanities	7.8	1.3	1.8	0.0	9.1
Physical Education and Health	4.5	1.2	0.7	0.0	5.7
Teaching Major					
Content in education[b]	3.1	14.3	0.0	0.4	17.4
Content outside education[c]	18.1	14.3	2.4	0.5	32.4
Equivalent technical credit	0.2[e]	—	0.0	—	0.2
Technical credit by exam	0.5	—	0.0	—	0.5
Education					
General Methods	0.0	2.4	0.0	0.0	2.4
Methods in teaching major	1.2	3.8	0.2	0.0	5.0
Practicum	0.4	0.6	0.0	0.0	1.0
Student teaching	—	9.9	—	0.0	9.9
Other[d]	0.9	8.3	0.1	0.2	9.2
Designated other[f]	3.0	0.7	1.6	0.1	3.7
Not classified	1.1	0.2	0.3	0.0	1.3
Total average credits	83.0	61.1	20.1	1.6	144.1

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).

BEST COPY AVAILABLE

Table F-6

Types and Total Credits of Coursework Completed by Prospective Trade and Industrial Vocational Teachers (n = 34)

Coursework Area	Average Credits				
			Transfer		
	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics and Computer Science	7.5	0.0	2.7	0.0	7.5
Social Science	16.5	2.4	6.9	0.1	18.9
Science	9.2	0.3	3.2	0.2	9.5
English	9.2	0.7	3.9	0.0	9.9
Language, Fine Arts, Philosophy, and Other Humanities	8.3	1.0	3.6	0.5	9.3
Physical Education and Health	5.5	1.5	2.0	1.2	7.0
Teaching Major					
Content in education[b]	1.6	11.0	0.1	0.3	12.6
Content outside education[c]	15.4	9.8	2.4	0.9	25.2
Equivalent technical credit	6.3[e]	—	6.3	—	6.3
Technical credit by exam	5.0	—	0.9	—	5.0
Education					
General Methods	0.1	1.6	0.0	0.0	1.7
Methods in teaching major	0.3	5.7	0.1	0.3	6.0
Practicum	0.1	1.7	0.0	0.0	1.8
Student teaching	—	8.9	—	0.0	8.9
Other[d]	1.5	6.0	0.0	0.3	7.5
Designated other[f]	1.3	0.9	1.0	0.0	2.2
Not classified	1.3	0.0	0.2	0.0	1.3
Total average credits	89.1	51.5	33.2	2.9	140.6

[a] Lower-level courses are those with numerical prefixes indicating that they are primarily for freshman- and sophomore-level students. Upper-level courses are those with numerical prefixes indicating that they are primarily for junior- and senior-level students.

[b] Content in education includes courses with an education prefix that are teaching major content courses (e.g., an office technology course offered through business education).

[c] Content outside education include courses related to technical field of prospective teacher (e.g., an animal science course completed by an agriculture education major).

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Equivalent technical credit and technical credit by exam are shown as lower level as they could not be classified as lower or upper level.

[f] Designated other courses are those providing technical preparation outside the teaching major (e.g., an accounting course completed by a home economics education major).